

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF THE CLAIMS:

Claims 1-27 (cancelled)

28. (currently amended) A method for manufacturing a semiconductor device having a bipolar transistor, a Schottky diode, and a resistance element formed in a first region, a second region, and a third region of a semiconductor substrate, respectively, said method comprising the steps of:

- (a) forming the bipolar transistor in the first region;
- (b) forming a first semiconductor layer of the Schottky diode in the second region;
- (c) forming an ohmic electrode of the Schottky diode, electrically connected to the first semiconductor layer, in the second region; and
- (d) forming a Schottky electrode of the Schottky diode, electrically connected to the first semiconductor layer, in the second region and a resistance film of the resistance element in the third region;
- (d) forming a first conductive film having a first portion and a second portion in the second and third regions, respectively; and

(e) forming a first wiring and a second wiring electrically connected to the second portion of the first conductive film;

wherein the first portion of the first conductive film and the first semiconductor layer of the Schottky diode have a Schottky contact; and

the first and second portions of the first conductive film are a Schottky electrode of the Schottky diode and a resistance film of the resistance element, respectively

wherein in the step (d), the Schottky electrode and the resistance film are made of a same layer.

Claim 29 (cancelled)

30. (original) A method according to Claim 28, wherein the bipolar transistor is a hetero-junction bipolar transistor.

31. (original) A method according to Claim 30, wherein the semiconductor substrate is made of GaAs.

32. (original) A method according to Claim 31, wherein the Schottky electrode and the resistance film are made of WSiN.

33. (currently amended) A method for manufacturing a semiconductor device having a bipolar transistor, a Schottky diode, and a resistance element formed in a first region, a

second region, and a third region of a semiconductor substrate, respectively, said method comprising the steps of:

(a) forming an emitter layer of the bipolar transistor in the first region;

(b) forming a base layer of the bipolar transistor, under the emitter layer, in the first region;

(c) forming a collector layer of the bipolar transistor, under the base layer, in the first region, and a first semiconductor layer of the Schottky diode in the second region;

(d) forming an ohmic electrode of the Schottky diode, electrically connected to the first semiconductor layer, in the second region; and

~~(e) forming a Schottky electrode of the Schottky diode, electrically connected to the first semiconductor layer, in the second region, and a resistance film of the resistance element in the third region;~~

(e) forming a first conductive film having a first portion and a second portion in the second and third regions, respectively; and

(f) forming a first wiring and a second wiring electrically connected to the second portion of the first conductive film;

wherein the collector layer of the bipolar transistor and the first semiconductor layer of the Schottky diode are made of a same layer;

the first portion of the first conductive film and the
first semiconductor layer of the Schottky diode have a
Schottky contact; and

the first and second portions of the first conductive
film are a Schottky electrode of the Schottky diode and a
resistance film of the resistance element, respectively

wherein in the step (e), the Schottky electrode and the
resistance film are made of a same layer.

Claim 34 (cancelled)

35. (currently amended) A method according to Claim
34_33, wherein a separation groove is formed between the
first region and the second region.

36. (original) A method according to Claim 35, wherein
the bipolar transistor is a hetero-junction bipolar
transistor, and the semiconductor substrate is made of GaAs.

37. (currently amended) A method according to Claim
33, further comprising the step of:

~~(f) forming a first wiring electrically connected to~~
~~the emitter layer, a second wiring electrically connected to~~
~~the base layer, a third wiring electrically connected to the~~
~~collector layer, a fourth wiring electrically connected to~~
~~the ohmic electrode, a fifth wiring electrically connected~~
~~to the Schottky electrode, a sixth wiring electrically~~

~~connected to the resistance film, and a seventh wiring electrically connected to the resistance film;~~
~~wherein the fifth to seventh wirings are made of a same material.~~

(g) forming a third wiring electrically connected to the ohmic electrode, a fourth wiring electrically connected to the Schottky electrode, a fifth wiring electrically connected to the emitter layer, a sixth wiring electrically connected to the base layer, and a seventh wiring electrically connected to the collector layer,
wherein the first to seventh wirings are made of a same layer.

38. (new) A method according to claim 28, wherein in the step (e), a third wiring electrically connected to the ohmic electrode, an a fourth wiring electrically connected to the first portion of the first conductive film are also formed.

39. (new) A method according to claim 38, wherein the first to fourth wirings are made of a same layer.

40. (new) A method according to claim 28, further comprising the steps of:

(f) between the steps (c) and (d), forming a first interlayer insulating film over the first semiconductor layer and ohmic electrode of the Schottky diode; and

(g) forming an opening in the first interlayer insulating film, which exposes the first semiconductor layer of the Schottky diode;

wherein in the step (d), the first portion of the first conductive film is formed in the opening; and

the second portion of the first conductive film is formed over the first interlayer insulating film.

41. (new) A method according to claim 40, further comprising the steps of:

(h) forming a second interlayer insulating film over the resistance film and Schottky electrode; and

(i) forming a first and a second contact hole, which expose the resistance film, in the second interlayer insulating film;

wherein the first and second wirings are formed over the second interlayer insulating film; and the first and second wirings and the resistance film are electrically connected via the first and second contact holes.

42. (new) A method according to claim 33, further comprising the steps of:

(g) between the steps (d) and (e), forming a first interlayer insulating film over the first semiconductor layer, ohmic electrode and emitter layer of the bipolar transistor; and

(h) forming an opening in the first interlayer insulating film, which exposes the first semiconductor layer of the Schottky diode;

wherein in the step (e), the first portion of the first conductive film is formed in the opening; and

the second portion of the first conductive film is formed over the first interlayer insulating film.

43. (new) A method according to claim 42, further comprising the steps of:

(i) forming a second interlayer insulating film over the resistance film, Schottky electrode of the Schottky diode and emitter layer of the bipolar transistor; and

(j) forming a first and a second contact hole, which expose the resistance film, in the second interlayer insulating film;

wherein the first and second wirings are formed over the second interlayer insulating film; and the first and second wirings and the resistance film are electrically connected via the first and second contact holes.